The effect of dietary caprylic acid on the Salmonella spp. shedding in experimentally infected broiler chickens

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The aim of this study was to evaluate the effect of caprylic acid (CA) on counts of salmonellas and coliforms in chickens which were reared on feed that was experimentally contaminated with Salmonella Enteritidis (Experiment 1). Furthermore, the effect of caprylic acid on salmonellas attached to broiler skin was tested (Experiment 2).

Experiment 1:
- Fourteen days old male Ross 308.
- Housed individually in metabolic cages.
- Fed a commercially available diet, ad libitum.
- Control diet vs. diet supplemented with 2.5 or 5 mg/ml of CA.
- 2nd day: feed was contaminated with Salmonella Enteritidis ATCC 13076 (Log10 CFU/ml = 9).
- Daily check of mortality and morbidity.
- 8th day: euthanised; crop and caecum taken for microbiological analyses.
- Selective cultivation & quantification on XLD and Mac Conkey agars.

Experiment 2:
- One day old male Ross 308, kept in a floor pen with wooden shavings.
- Fed a commercially available wheat-soybean-maize diet, ad libitum.
- No experimental diets during the fattening.
- 35th day: slaughtered, chicken carcasses obtained & chilled for 24h/4°C.
- After chilling stage, carcasses were washed & subsequently surface-contaminated with S. enteritidis ATCC 13076 (Log10 CFU/ml = 6).
- One half was treated with 0.75 mg/ml of CA for 1 min, the second half was kept as a control (treated with sterile saline for 1 min).
- Selective cultivation & quantification on XLD and Mac Conkey agars.

Results:
The influence of CA (2.5 g/kg) on numbers* of coliforms and salmonellas (log10 CFU/g) in crop and caecum contents of infected chickens

<table>
<thead>
<tr>
<th></th>
<th>Crop contents</th>
<th>Caecum contents</th>
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<tbody>
<tr>
<td></td>
<td>Negative control</td>
<td>Positive control</td>
</tr>
<tr>
<td>Coliforms</td>
<td>5.2 ± 0.6a</td>
<td>4.9 ± 0.5a</td>
</tr>
<tr>
<td>Salmonellas</td>
<td>&lt; 2b</td>
<td>4.7 ± 0.3a</td>
</tr>
</tbody>
</table>

*Means ± SD
a, b Values of crop or caecum contents in the same row with the different superscript are significantly different (P < 0.05)

The influence of CA (5 g/kg) on numbers* of coliforms and salmonellas (log10 CFU/g) in crop and cloaca contents of infected chickens

<table>
<thead>
<tr>
<th></th>
<th>Crop contents</th>
<th>Caecum contents</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Negative control</td>
<td>Positive control</td>
</tr>
<tr>
<td>Coliforms</td>
<td>6.8 ± 0.4a</td>
<td>6.1 ± 0.9a</td>
</tr>
<tr>
<td>Salmonellas</td>
<td>&lt; 2b</td>
<td>5.0 ± 0.7a</td>
</tr>
</tbody>
</table>

*Means ± SD
a, b Values of crop or caecum contents in the same row with the different superscript are significantly different (P < 0.05)

Effect of caprylic acid on number of salmonellas (Log10 CFU/g) recovered from the chicken skin during 3-day storage

![Graph showing the effect of caprylic acid on salmonellas recovery](image)

It can be concluded that caprylic acid is able to reduce numbers of salmonellas in the gastrointestinal tract of chickens and has a potential to improve health status of infected animals. The surface treatment of chicken skin with caprylic acid may be considered as another way of application.

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